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**ABSTRACT OF THE DISCLOSURE**

In a process for producing a low polarization mode dispersion optical fiber, the steps of drawing a glass preform into an optical fiber and of spinning during drawing, the optical fiber about an optical fiber axis. The spinning is imparted according to a bidirectional and substantially trapezoidal spin function, which includes zones of substantially constant amplitude (plateau) and zones of transition where inversion of the spin direction takes place, wherein the extension of the zones of substantially constant amplitude is greater than the extension of the zones of transition, and the number of inversions of the direction of spin in a length of fiber of 20 m is at most two.